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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,744	12/02/2003	Larry C. Olsen	23-65037	6833

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EXAMINER	
BARTON, JEFFREY THOMAS	
ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/726,744	OLSEN ET AL.	
	Examiner	Art Unit	
	Jeffrey T. Barton	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-18,23-25 and 37-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3, 5-18, 23-25, and 37-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20071129*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed on 29 November 2007 does not place the application in condition for allowance.

Status of Rejections Pending Since the Office Action of 27 June 2007

2. All rejections of claims 4 and 19-22 are withdrawn due to cancellation of the claims

3. All other rejections are maintained.

Declaration under 37 C.F.R. §1.131

4. The declaration filed on 29 November 2007 under 37 CFR 1.131 has been considered but is ineffective to overcome the Stark et al reference.

5. The evidence submitted is insufficient to establish a reduction to practice of the invention in this country or a NAFTA or WTO member country prior to the effective date of the Stark et al reference. The declaration and accompanying exhibit do not demonstrate complete reduction to practice of the instantly claimed invention. Relevant to claims 1 and 37, there is no evidence that a power source comprising the instant electrically conductive member was conceived or reduced to practice prior to the effective filing date of the Stark et al reference. Relevant to claim 23, there is no evidence that a source having a volume less than 10 cm^3 and an output from 1 μW to about 1 W was conceived or reduced to practice prior to the effective filing date of Stark

et al. Also relevant to claim 37, there is no evidence that the claimed coil configuration was conceived or reduced to practice prior to the effective filing date of Stark et al.

In addition, the declaration is only signed by one of the four named inventors in this application. (i.e. Larry C. Olsen) In order to be effective, a declaration under 37 C.F.R. §1.131 must be signed by all named inventors unless it is demonstrated that fewer inventors were responsible for the invention of the subject matter of the claims under rejection. Note MPEP §715.04 as to the formal requirements of declarations under 37 C.F.R. §1.131.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 5, 6, 13-15, 17-18, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by DE 297 23 309 U1 (DE '309).

DE '309 discloses a thermoelectric power source as shown in figure 1.

Regarding claims 1 and 5, DE '309 discloses the power source comprising a flexible substrate, 1, having an upper surface and a thermoelectric couple, 4, comprising

a sputter deposited thin film p-type thermoelement, 4', a sputter deposited thin film n-type thermoelement, 4", and an electrically conductive member, 4'", electrically connecting the ends of the thermoelements (figure 2 and page 4, paragraphs 2 to 5). DE '309 teaches bismuth telluride as the thermocouple material. (Page 2, 4th paragraph) The stoichiometric formula of bismuth telluride is Bi_2Te_3.

Regarding claims 6, 13-15, 17, and 18, the claim limitations; thermoelectric composition, power output, device volume and substrate type, are disclosed within the reference (see page 2 and page 4, paragraphs 2 to 5).

Regarding claim 23, DE '309 discloses the power source comprising a flexible substrate, 1, having an upper surface and a thermoelectric couple, 4, comprising a sputter deposited thin film p-type thermoelement, 4', a sputter deposited thin film n-type thermoelement, 4", and an electrically conductive member, 4'", electrically connecting the ends of the thermoelements (figure 2 and page 4, paragraphs 2 to 5). The thermoelectric power source having a volume of less than about 10 cm^3.and a power output from 1 μW to 1 W (page 2, paragraph 4).

8. Claims 1-3, 5, 10, and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Stark et al. (U.S.P.G.Pub 2004/0231714).

Stark discloses a thermoelectric power source as shown in figure 1.

Regarding claims 1, 4, and 5, Stark discloses the thermoelectric device is comprised of thin film semiconductors assembled in alternating p- and n-type arrays (figure 2 and paragraph 0029). Stark discloses sputter depositing thin film p-type

thermoelements, 34, sputter depositing thin film n-type thermoelements, 32, and an electrically conductive metal bridge, 26, connecting the ends of the thermoelements (figure 2 and paragraphs 0032, 0035 and 0044). Stark discloses the use of Bi_2Te_3. (Paragraph 0023)

Regarding claims 2 and 3, the dimensions of Stark gives L/A ratios of greater than 100 cm^{-1} (thickness of 5 microns, width of 10 microns, length of 100 microns; see paragraphs 0032 and 0034).

Regarding claim 10, figure 3 shows p-type elements having different widths than the n-type elements.

Regarding claim 18, Stark discloses the use of polyimide as the substrate (paragraph 0041).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stark et al. (U.S.P.G. Pub 2004/0231714).

Stark discloses a thermoelectric power source as shown in figure 1.

Regarding claim 23, Stark discloses the thermoelectric device is comprised of thin film semiconductors assembled in alternating p- and n-type arrays (figure 2 and paragraph 0029). Stark discloses sputter depositing thin film p-type thermoelements, 34, sputter depositing thin film n-type thermoelements, 32, and an electrically conductive metal bridge, 26, connecting the ends of the thermoelements (figure 2 and paragraphs 0032, 0035 and 0044).

Regarding claim 24, Stark discloses that the thermocouples are connected electrically in series and thermally in parallel, which meets the limitation of the claim. (Figures 1 and 2; Paragraph 0035)

Regarding claim 25, figure 3 shows p-type elements having different widths than the n-type elements.

The differences between Stark and the claims are the requirements of a specific volume and power output.

The choice of a specific, volume for the device and a power output are dependent on the specific application for the device. Absent any unexpected results, it would have been obvious to one of ordinary skill in the art at the time the invention was made to choose a specific volume and output power as within the claims for the device of Stark. Also Stark discloses the choice of number of thermocouples within the device is dependent on the required power for the device (paragraph 0039), thus making this choice determines the power output and the device size. Therefore the claims are obvious over Stark.

13. Claims 6-9, 11, and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stark as applied to claims 1-5, 10, and 18 above.

The disclosure of Stark is as stated above for claims 1-5, 10 and 18. Further, regarding claims 7 and 8, the dimensions disclosed by Stark include at least 0.1 mm in width and at least 20 angstroms in thickness (paragraphs 0032 and 0034). Also Stark discloses the use of greater than 50 or 1000 thermocouples (paragraph 0039).

The differences between Stark and the claims are the requirements of specific power outputs, electrical configurations, volume of the device and element lengths.

The choice of a specific volume for the device and a power output are dependent on the specific application for the device. The specific wiring methods, series or parallel, also affects the power/current outputs for the device and are well known within the art to alter the wiring to meet the specific requirements of an application. Absent any unexpected results, it would have been obvious to one of ordinary skill in the art at the time the invention was made to choose a specific volume, wiring method and output power as within the claims for the device of Stark. Also Stark discloses the choice of number of thermocouples within the device is dependent on the required power for the device (paragraph 0039), thus making this choice determines the power output and the device size. The choice of element length is a further design choice that is obvious to one skilled in the art. Therefore the claims are obvious over Stark.

14. Claims 12, 17, and 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stark as applied to claims 1-5, 10 and 18 above, and further in view of Barr et al. (U.S. 4,036,665).

The disclosure of Stark is as stated above for claims 1-5, 10 and 18. The difference between Stark and claims 12 and 37 is the requirement of a coiled substrate configuration. The difference between Stark and claim 17 is the requirement of a specific n-type element. The additional difference between Stark and claim 38 is the required element dimensions. The additional difference between Stark and claim 39 is the required power output.

Barr teaches a thermopile for a thermoelectric generator. The thermopile is shown in figure 1 and comprises bismuth telluride elements sputter deposited onto a polyimide substrate (abstract). The substrate is coiled up (column 2, lines 58-61). Barr further teaches the use of n-type dopants such as cuprous bromide, silver iodide and antimony iodide (column 2, lines 47-49).

Regarding claims 12 and 37, it would have been obvious to one of ordinary skill in the art at the time the invention was made to coil up the substrate as within Barr for the device of Stark, because the coiled substrate is pencil thin, thus taking up much less space. It would have been further obvious to one of ordinary skill in the art at the time the invention was made to utilize an n-type dopant as within Barr to dope the n-type elements of Stark because Barr discloses dopants are commonly used n-type dopants in the art. Because Barr and Stark are both concerned with thin film thermoelectric devices, one would have a reasonable expectation of success from the combination.

Regarding claims 38 and 39, Stark discloses the choice of number of thermocouples within the device is dependent on the required power for the device (paragraph 0039), thus making this choice determines the power output and the device size. The choice of element length is a further design choice that is obvious to one skilled in the art, absent any evidence of criticality or unexpected results. Therefore the claims are obvious over Stark.

Thus the combination meets the claims.

Response to Arguments

15. Applicant's arguments filed 29 November 2007 have been fully considered but they are not persuasive.

Applicant argues that the DE '309 reference does not disclose the claimed formulas, as it teaches only the genus "bismuth telluride". This is not persuasive, because conventional thermoelectric bismuth telluride is Bi_2Te_3, as is known by anyone familiar with the thermoelectric art. This formula meets the limitations of the claims. Likewise, this disclosure is enabling, since a skilled artisan reading the reference would have recognized that Bi_2Te_3 is the material used within DE '309.

Applicant further argues that DE '309 does not teach at least 50 thermoelectric couples as required in claim 6. This limitation is clearly met by the disclosure of the 2nd paragraph of page 2 of the translation. Note that claim 6 does not require the 50 couples to be on a single substrate. Applicant states in describing DE '309 that DE '309 teaches output of 10 μW and 3V, which clearly meets the claim limitations.

Applicant further argues that DE '309 does not teach n-type thermoelements that are substantially free of selenium. The Examiner notes that the recited "bismuth telluride" of DE '309 does not include selenium.

Applicant further argues that DE '309 does not disclose a polyimide substrate. This is incorrect, as polyimide film substrate 1 is clearly disclosed in the 2nd paragraph of page 4 of the translation. A polyimide film substrate is flexible.

Applicant's contention that DE '309 teaches away from rolling a flexible substrate is not relevant to any of the claims that are rejected as anticipated by this reference.

Applicant's arguments that Stark is not available as prior art are not persuasive due to the deficiencies in the declaration under 37 C.F.R. §1.131, as noted above.

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Jeffrey T. Barton whose telephone number is (571)272-1307. The examiner can normally be reached on M-F 9:00AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit 1753

JTB
13 February 2008